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# Soil and Water Conservation News

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## Comments:

*From the  
SCS Chief*

### SCS and Conservation Districts—Effective Teamwork

Today, nearly 3,000 conservation districts cover almost all of the privately owned land in the United States. These districts are run by local citizens who work together and with Federal, State, and local agencies to improve resource conditions.

The main source of technical assistance to conservation districts is the Soil Conservation Service. It is mainly through this assistance that districts help individuals, groups, and units of government conserve natural resources.

A close working relationship between conservation district officials and the SCS staff assisting the district is a must. It is vital that each fully understands the policies, procedures, goals, and priorities of the other.

It's also essential that SCS and districts cooperate in planning their short- and long-term objectives for meeting local natural resource needs. Agreement on what they want to achieve and how they should go about it will help determine their success.

The first line of contact between SCS and districts is the SCS district conservationist assigned to provide technical assistance to land users through the district. This line of contact is established by basic and supplemental memoranda.

Once a year, district leaders and the SCS district conservationist should review the district's basic memorandum of understanding with USDA, the district's supplemental agreement with SCS, and other agreements the district may have entered. Periodically, they should review the long-range plan on which the memoranda are based and change it as needed to reflect current conservation problems and goals.

On an annual basis, district leaders and the SCS district conservationist should jointly review current resource conditions. This should result in a plan that addresses resource needs for the year ahead, including goals, priorities, and how and when specific items are to be completed.

From my experience as a conservation district leader, I know it's hard to set the time aside for planning ahead when you're busy doing what has to be done today. But I firmly believe that it will keep our conservation efforts on track nationwide.

Setting local soil and water conservation goals and working together to reach them make SCS and districts a more effective team.



Cover: James R. Bushey, SCS soil conservation technician in Hanford, Calif., measures the level of irrigation water in a flume in a furrow-irrigated tomato field. Four mobile lab teams in California are collecting this and other data to help growers improve irrigation efficiencies on their farms. See article on page 7. (Photo by June Davidek, public affairs specialist, SCS, Davis, Calif.)

## Connecticut Passes Law to Control Soil Erosion at Construction Sites

The State of Connecticut covers more than 3 million acres. About 70 percent of it is on upland soil, and 20 percent has slopes greater than 15 percent.

Close to half of the total land area is already committed to long-term uses such as housing, commercial development, utilities, schools, churches, forests, and parks. In the past, people have built their homes and businesses on the flat areas, and now development is moving onto steeper lands that erode more easily.

Over the last 10 years, building permits for new construction averaged 16,000 a year. Rates of soil erosion from some of these developing areas can exceed 100 tons per acre per year according to the Connecticut Council on Soil and Water Conservation.

Significant amounts of the eroded soil enter inland wetlands and water courses, destroying wildlife habitat and killing fish and other aquatic life. Sediment deposited in stream channels and conduits decreases their capacity, increasing the frequency of flooding and driving up maintenance and dredging costs.

In 1983, to control soil erosion and reduce sedimentation in developing areas, the Connecticut General Assembly passed Public Act 83-388, the Soil Erosion and Sediment Control Act. The act requires that a state-wide coordinated sediment and erosion control program be established and implemented by municipalities beginning July 1, 1985. The act affects commercial, residential, and industrial development.

Under the act, municipal planning and zoning commissions must adopt regulations that will provide adequate soil erosion and sediment control at construction sites. The regulations will require a soil erosion and sediment control plan for each development proposal that will involve disturbing an area larger than one-half of an acre. The act excludes a single-family home that is not part of a subdivision.

The act further requires that municipalities certify that the plans comply with the regulations. They may ask their local soil and water conservation district to do it or

handle the task themselves with the conservation district providing technical assistance. To be certified, a plan should follow the principles and practices outlined in the Connecticut Guidelines for Soil Erosion and Sediment Control.

The act also requires municipalities to make periodic site inspections of construction sites to ensure that planned measures are being used.

About 70 of the State's 169 municipalities already had some kind of soil erosion and sediment control guidelines for developing areas when the new legislation was passed. Statewide guidelines will reinforce these and create controls for towns that had none.

The Connecticut Council on Soil and Water Conservation developed model regulations that towns could adopt or modify. Towns with existing erosion and sediment control regulations could incorporate parts of the model regulations to meet the statutory requirements.

The Soil Conservation Service and other Federal, State, and local agencies cooperated with the Council on writing the guidelines and model regulations. Conservation districts, SCS, the Cooperative Extension Service, and regional planning agencies held workshops throughout the State to help municipal officials understand the requirements of the act and adopt suitable regulations.

Municipalities are responsible for enforcing compliance with the soil erosion and sediment control plans during construction. Many are assigning the task to those already responsible for enforcing subdivision and zoning regulations.

Recommended erosion control practices include using filter fabric or hay bales to trap sediment onsite, establishing grassed or stone-lined waterways before disturbing the landscape, and setting specifications for seeding of disturbed areas.

Other practices that help reduce erosion and sedimentation are paving roads with one coat of asphalt during construction, clearing the land as it will be developed instead of clearing the entire project area at one time, and installing storm drains and utilities before construction begins to avoid repeated disturbance of the landscape.

Tom Mocko, executive director for the

Connecticut Council on Soil and Water Conservation, said that certifying developers' erosion and sediment control plans and making onsite inspections will cost municipalities time and money in the short run.

"To cut costs," said Mocko, "some towns are planning to share the expense of hiring a person to review plans and make inspections. That makes sense because some towns administer over 300 building permits a year while others administer only a few."

Said Mocko, "The principal benefit of the Soil Erosion and Sediment Control Act will be less sediment entering wetlands, streams, and existing stormwater systems which are usually cleaned out at taxpayers' expense. In Connecticut about \$2 million is spent every year to remove sediment from ditches, storm drains, harbors, reservoirs, lakes, ponds, and streams," said Mocko. "The long-term savings here will help to offset the expense of the new mandate."

Jim Lash, a member of the Connecticut Home Builders Association and a private planning consultant who works with developers, said that the new regulations will have varying effects on developers. Those who already employ environmentalists and incorporate soil saving measures into their plans will be little affected, he said. Smaller operations may have more difficulty meeting the requirements of the act.

Said Mocko, "It may be the smaller operators who will be requesting technical assistance from conservation districts in drawing up their soil erosion and sediment control plans."

"The Connecticut Home Builders Association encourages professionalism in all building endeavors," said Lash. "Using measures to control soil erosion on construction sites is part of that."

Mocko reports that so far about half of the municipalities in Connecticut have adopted sediment and erosion control regulations. The rest have requested time extensions which can provide up to one additional year to adopt regulations.

Nancy M. Garlitz,  
associate editor, *Soil and Water Conservation News*,  
SCS, Washington, DC





## Land, Pasture, and Range Judging Contest Held

The 34th Annual Land, Pasture, and Range Judging Contest held outside Oklahoma City, Okla., May 1-2, attracted nearly 800 contestants from 32 States. Nineteen of the States produced award winners. Five grand champions were from Florida; four from Oklahoma; two from Indiana; and one each from South Dakota, Texas, Louisiana, and Kentucky.

The contest, held this year at Boys Ranch Town near Edmond, involved three judging events: land judging, pasture and range judging, and homesite evaluation. Each event has three divisions: 4-H and Future Farmers of America (FFA), competing both as teams and individuals; and adults. Contestants evaluate topsoil, subsoil, slopes, and other characteristics, and recommend treatment to improve the land's adaptability for certain purposes.

Joined in conducting the contest were people from Oklahoma 4-H, FFA, Soil Conservation Service, Oklahoma State

University, and numerous other agricultural organizations.

This year's annual honoree was Roy Stewart, director with the Oklahoma County Conservation District. Stewart became the first executive secretary of the Oklahoma Association of Future Farmers of America in 1937 and has been involved in youth activities for many years. Stewart is an author, historian, administrator, stockman, and newspaperman. He has served on several planning committees and the steering committee for the International Land, Pasture, and Range Judging Contest.

Over 970 people attended the awards banquet in Oklahoma City on May 2. More than 200 awards of cash, trophies, and medals were given by the Federal Land Bank of Wichita and its affiliated land bank associations in Oklahoma, Kansas, Colorado, and New Mexico, primary sponsors of the event.

F. Dwain Phillips,  
public affairs specialist, SCS, Stillwater, Okla.



Top photo, a contestant in the 34th Annual Land, Pasture, and Range Judging Contest in Oklahoma estimates percent slope. Bottom photo, in soil pits, contestants check depth of topsoil to judge how much soil erosion has occurred.

## EPA to Survey Agricultural Pesticides in Ground Water Used for Drinking

The United States Environmental Protection Agency (EPA) is preparing to make a national survey of agricultural pesticides occurring in ground water used for drinking. The survey is a joint effort of EPA's Office of Drinking Water and Office of Pesticide Programs.

"Roughly 1,500 private and public wells used for drinking water in 200 counties will be tested," said Stuart Cohen, ground water team leader in EPA's Office of Pesticide Programs. "Several samples per well will be taken and the samples will be analyzed for the presence of herbicides, insecticides, nematocides, and growth regulators and their transformation products."

EPA expects to have samples analyzed for close to 50 different pesticides, which will be selected for testing based mainly on their leaching potential.

To estimate where pesticides are being used, EPA is using Doane Marketing data and county-level crop acreage and other

data from the U.S. Department of Commerce's Census of Agriculture.

EPA will be using Soil Conservation Service and U.S. Geological Survey data bases in locating sites most vulnerable to contamination. The agency also expects to work with State Cooperative Extension Service and SCS field employees in selecting and locating individual wells.

The sampling will be done over a period of 2 years beginning in the spring of 1986.

Before the water testing begins, EPA is looking at the health implications of finding some of these pesticides in drinking water.

The agency will be deciding what to advise local governments to do if dangerous levels of these substances are found in underground drinking water supplies. During testing, EPA will be reporting levels of pesticides that exceed health guidelines to State agencies immediately.

The three main goals of the survey are to estimate the extent of well contamination from farming practices, correlate the test results with field conditions such as pesticide usage and depth to ground water, and estimate the extent of human exposure to agricultural pesticides.

"The statistical design of the survey ensures that potential problem areas will be located," said Cohen. "Without sacrificing the statistical validity of the survey, we will be oversampling areas with a high potential for contamination." The final report from the pesticide survey is scheduled to be completed in 1988. The cost is estimated at slightly more than \$5 million.

"About 40 percent of the people using public water systems and more than 90 percent of our rural population depend on ground water for drinking," said Peter C. Myers, U.S. Department of Agriculture Assistant Secretary for Natural Resources and Environment, at a symposium in May on offsite effects of soil erosion.

"That's enough reason to make us realize how important it is to keep the use of farm chemicals close to recommended levels according to the crop, soil, and climate."

**Nancy M. Garlitz,**  
associate editor, *Soil and Water Conservation News*,  
SCS, Washington, DC

## **Bennett Remembered**

This year's observances of the 50th anniversary of the Soil Conservation Service have included tributes to Hugh H. Bennett (1881-1960), the founder and first chief of SCS.

Several conservation organizations joined together in April to dedicate a memorial to Bennett at his birthplace in Anson County, N.C. That same month, Bennett was inducted into the Agricultural Hall of Fame in Bonner Springs, Kans.

More than 600 people, including members of Bennett's family, attended the ceremonies at Bennett's birthplace, near Wadesboro. Officials were present from the Soil Conservation Society of America, the National Association of Conservation Districts, the North Carolina Association of Soil and Water Conservation Districts, SCS, and other conservation organizations. U.S. Representative William Hefner gave the keynote address.

Bennett's induction into the Agricultural Hall of Fame was accompanied by an anniversary exhibit prepared by the Kansas State office of SCS. The exhibit is titled "A Half Century of Progress . . . from Dustbowl Despair to Bountiful Harvests that Feed the World."

Bennett served as head of SCS from its founding in 1935 until 1951. Perhaps more than anyone else, he is credited with making the American public and their elected representatives aware of the threat posed by soil erosion and with helping to create national programs for soil conservation.

An early conservationist, Louis Bromfield, wrote of Bennett in the preface to Bennett's biography, *Big Hugh*: "Like all great men, he was simple and direct, with no time for shiftiness or pomposity. The farmer liked him, the average citizen liked him, the scientists recognized in him that most needed of all forces—the one that translates research and knowledge into action and achieves results."

**Andrew R. Smith,**  
public affairs specialist, SCS, Raleigh, N.C.

**Fred L. Trump,**  
public affairs specialist, SCS, Salina, Kans.

## **Symposium to Focus on Agricultural Waste Management and Pollution Abatement**

The comprehensive management of wastes from agricultural production, marketing, and processing facilities, leading to agricultural pollution abatement, will be discussed at an international symposium this December.

At the Fifth International Symposium on Agricultural Wastes, scheduled for December 16-17, 1985, in Chicago, Ill., hundreds of professionals from around the world will discuss the latest technologies in agricultural waste management.

Topics to be explored at the symposium include:

- Runoff, nonpoint source pollutants, and chemical contaminants;
- Energy recovery processes;
- Wastewater treatment by land application;
- Liquid manure collection, storage, and transportation;
- Digester types and designs;
- Manure utilization as livestock feed;
- Land application of manure for fertilizer;
- Waste recycling;
- Land application and storage;
- Odor control;
- Digester case studies and biochemistry;
- Lagoon treatment; and
- Food processing wastes.

The American Society of Agricultural Engineers is sponsoring the event, which is cosponsored by 18 organizations, including the Soil Conservation Service.

A copy of the program and registration information are available from Loretta Dibble, American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, Mich. 49085-9659.



## Range Conference Called

Secretary of Agriculture John R. Block has invited more than 60 private organizations to join the U.S. Department of Agriculture and other Government agencies in a National Conference on Range, November 6–8, 1985, in Oklahoma City, Okla.

The technical gathering in November will bring together more than 800 people representing range management groups, range user groups, agribusiness, environmental organizations, and natural resource agencies. The conference will focus on innovation in management, efficiency of production, improved harvesting and marketing methods, new uses for goods and services obtainable from range, and techniques for conserving and improving range in ways that will both strengthen the economy and protect the environment.

"America's range is an important asset to agriculture, to the overall U.S. economy, and to the quality of our environment, and we need new ideas for its care and use," said Block. "These lands provide forage for livestock, habitat for wildlife, water supplies, minerals, and opportunities for recreation. The gradual improvement of range since 1935 represents one of the major environmental success stories of this century.

"Nonetheless," Block said, "well over half of the Nation's Federal and privately owned range is in poor or fair condition." Block said these lands need improvement not only for meeting future food and fiber needs but also for helping ensure water and air quality, fish and wildlife habitat, and economic stability.

Range and forested range cover more than 800 million acres, or 37 percent of the total land area of the United States, excluding Alaska. The Federal Government manages 224 million acres of rangeland and 107 million acres of forested range. State governments own another 34 million acres of range. Private owners hold the largest share—406 million acres of open and 66 million acres of forested range. Information on the conference is available from Douglas Sellars, executive secretary of the conference steering committee, c/o National Rangeland Conference, P.O. Box 2890, Washington, DC 20013–2890.

## Floodplain Managers to Hold Convention

The Association of State Floodplain Managers has issued a "Call for Papers" for its upcoming annual convention. The convention will be held June 17–19, 1986, in Pittsburgh, Pa. The theme of the convention is "Backwaters '86: Strengthening Local Flood Protection Programs."

The Association of State Floodplain Managers is the primary national association whose goal is the reduction of flood hazards through floodplain management. The association invites papers that address all aspects of local flood protection programs. The following topics are of particular interest to the association:

- Improving flood management assistance to local units of government;
- Integrating flood concerns with planning and zoning regulations;
- Improving flood prevention programs aimed at private property owners;
- Integrating State and Federal policies and regulations into local decisionmaking;
- Designing flood control works that protect or enhance environmental values;
- Increasing the cost effectiveness of small flood control projects;
- Delineating and analyzing the current legal issues facing local government flood managers;
- Assessing flood vulnerability;
- Developing improved flood warning capabilities;
- Assessing the effectiveness of local flood preparedness programs;
- Determining the role of the private sector in local flood hazard mitigation programs;
- Developing and using computer-related products for hydrologic and hydraulic analyses; and
- Describing a successful stormwater management program.

Abstracts must be submitted by November 30, 1985. To submit abstracts or for more information, write to Allan N. Williams, 1986 Conference Program Chairman, Connecticut Department of Environmental Protection, 165 Capitol Avenue, Room 553, Hartford, Conn. 06106, or telephone (203) 566-3540.

## Conference Focuses on Nonpoint Source Pollution

During May in Kansas City, Mo., the North American Lake Management Society cosponsored a conference entitled "Perspectives on Nonpoint Source Pollution" with seven other agencies including the U.S. Department of Agriculture's Soil Conservation Service and Forest Service.

Close to 1,000 people concerned with nonpoint source pollution attended the conference designed as a forum to draw practical information on nonpoint source pollution control from the audience as well as the more than 150 presenters.

The conference brought together all those concerned with nonpoint source pollution—agricultural, forestry, mining, construction, industry, governmental, environmental, and other interests, both public and private. They discussed how nonpoint source pollution relates to many urban, rural, and agricultural issues. They also discussed monitoring and assessment techniques and legal and economic aspects of nonpoint source pollution.

Secretary of Agriculture John R. Block addressed the conference via satellite on May 20. "The President's 1982 National Soil and Water Conservation Program established nine priorities for the use of USDA soil and water conservation program funds," he told them. "Our commitment to solving water problems is second only to erosion control.

"I want to assure all of you that we are indeed committed to improving the quality of our Nation's water supplies . . . within the limits of our financial resources and our traditional responsibilities," said Block.

"Where State and local officials have identified water quality to be more important than gross soil erosion—I can assure you that we stand ready to target our resources into nonpoint source pollution from agriculture."

Published proceedings from the Perspectives on Nonpoint Source Pollution Conference will be available in October from the North American Lake Management Society, Suite 1000, 1815 H Street, NW., Washington, DC 20006.



# Mobile Lab Teams Evaluate Irrigation Systems

**F**our mobile lab teams in California evaluate irrigation systems and help growers improve irrigation efficiencies on their farms. A typical mobile lab team consists of a resource conservationist and two engineering technicians and also may include a soil scientist and a salinity engineer. These Soil Conservation Service or conservation district personnel staff the Mobile Agricultural Water Conservation Laboratories—trucks equipped with irrigation evaluation equipment ranging from catch cans and orifice plates to state-of-the-art neutron moisture gauges and tensiometers.

The labs serve four highly productive agricultural counties in California's central valley plus the Imperial Valley in the southern part of the State. The agricultural productivity of these areas increasingly depends on proper management of irrigation water and salinity.

The labs promote water conservation and salinity control. "We're demonstrating what an irrigation system evaluation is and how it can help growers improve the efficiency of their irrigation," said Robert A. Fry, SCS resource conservationist in charge of the mobile lab near Fresno.

An irrigation system evaluation includes several steps. Before the field evaluation begins, the team discusses the system with the cooperator and gets basic resource and management data through interviews, review of soil surveys, and observations of irrigations in progress. Team members analyze the data and determine if they can make recommendations based on them. Usually, more information is needed.

Team members then schedule a field evaluation. To evaluate a surface irrigation system, they go to a field the day before to make preparations. This includes setting up soil infiltration rate measuring equipment, staking and flagging rows at measured distances, setting up water meters on valves or other flow-measuring devices, and taking soil samples.

On the day of the evaluation, members monitor a typical irrigation. They record how rapidly the water advances down the furrow, measure soil intake rates, make general observations such as noting the high and low spots of the field and other problems,

record when the water is turned off, and monitor recession. They gather data on flow rates, water quality, and soil salinity.

A day or two later, the team resamples the soil close to the original sample sites and evaluates alternatives. With computers, many alternatives can be evaluated in just minutes.

Team members write up the evaluation and make recommendations. The recommendations are in narrative form and may include charts and graphs and other information. Team members deliver the recommendations to the cooperators, discuss them, and answer questions.

Near Hanford, growers face a double problem—saline soils and a high water table. Saline soils normally can be leached by applying enough irrigation water to carry the salts below the root zone of the plants. But a high water table eliminates this as a solution—rather than percolate down, the salts would stay in the root zone. Irrigation system evaluations help these Hanford growers manage water to keep sodium out of the root zone and to improve application efficiency, reducing the amount of water going into the already-too-high water table.

Evaluations can help growers in many other ways, according to Fry. "We can make a difference on how water is managed when water gets expensive or we're in a drought. Technically sophisticated irrigation systems like trickle, sprinkler, linear move, and center pivot can have lots of maintenance problems. We can help. Evaluations have a great potential in helping growers improve the maintenance and operation of pressurized systems," said Fry.

SCS's goal is to interest the private sector in performing the evaluations. "Large, corporate farms are interested in working with us. They often learn our techniques and then apply them to analyze their own irrigation systems.

The Mobile Lab program is a cooperative effort with the California Department of Water Resources Office of Water Conservation, Resource Conservation Districts, and the Soil Conservation Service.

June Davidek,  
public affairs specialist, SCS, Davis, Calif.



Robert A. Fry, SCS resource conservationist and leader of a mobile lab team near Fresno, Calif., unloads fiberglass flumes used in evaluating furrow irrigation systems.

# Ohioan Irrigates Muck Soil

**C**enter-pivot irrigation systems are common in some of the dry Western States. But why would anyone in Hardin County, Ohio, want one?

Hardin County receives about 35 inches of rainfall a year. This is enough rainfall, when it falls at the right time, to grow almost any crop. If anything, most of the soils here are too wet and need drainage—not irrigation.

A few farmers in the flat, western part of the county, however, have another problem. When dry, their soil is so light and powdery that a stiff breeze can darken the sky with windblown soil and destroy acres of young plants.

These farmers farm the Scioto Marsh, a 12,000-acre area of dark, muck soil that supports some of the most productive farmland in the State. Most grow corn and soybeans.

One of the farmers in the area, Ron Wyss, recently installed a center-pivot irrigation system. Wyss plans to use the irrigation system to grow high-value specialty crops and, at the same time, reduce the wind erosion by keeping the soil moist during windy periods.

"I don't see this as an experiment," said Wyss, who farms several hundred acres of the muck soil. "I see it as insurance. The muck is only about 12 inches deep, and this will help hold it. And, in dry years, I will have a good crop at least in this one field."

This year he is growing carrots and pop-

corn under irrigation; next year he plans to try potatoes. By irrigating during critical plant growth periods, Wyss hopes to be able to maintain yields even in dry years and get his crops to market early in the season for better prices.

Specialty crops have been grown in the marsh before. About 50 years ago, it was famous as an onion-growing area. It was drained by subsurface tile and protected from wind erosion by rows of willow trees, most of which have since died or been removed.

The irrigation system obtains water from a 325-foot-deep well at its center and is equipped with a 40-horsepower pump that can draw 600 gallons per minute and provide the equivalent of 0.2 inch of rainfall during one 24-hour revolution around his 160-acre field. Wyss estimates that he will apply about 5 inches of water each year.

To reduce wind drift of the water during application, the system is designed to operate at low pressure. As a result, the individual drops are larger and less likely to be blown by the wind.

"You couldn't do that with some soils," Wyss said. "The big drops would cause crusting of the surface, which reduces water infiltration and plant emergence. But crusting isn't a problem on muck soils. They just soak everything up and hold together when wet."

Wyss is also applying some of the more

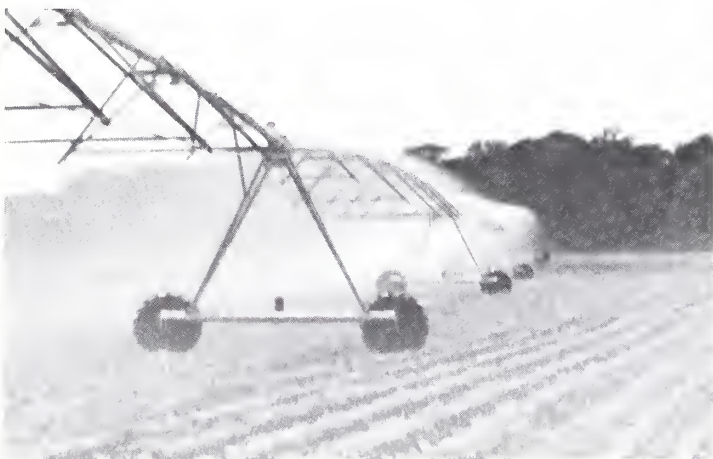
conventional practices to control wind erosion. With assistance from the Hardin Soil and Water Conservation District, he has planted poplar trees to form more than 4 miles of new windbreaks. He is also practicing reduced tillage on much of his other cropland.

"Proud as I am of the new irrigation system, I think these poplar trees are going to be one of the most rewarding things I've done," Wyss said. "They'll be here after I'm gone."

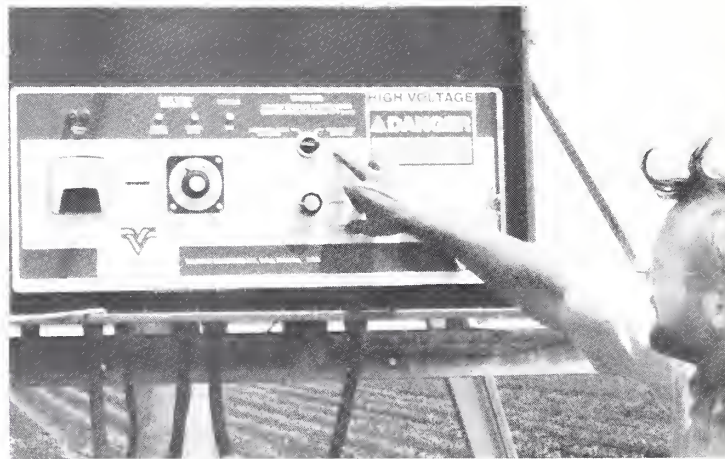
According to Donald J. Pettit, SCS district conservationist at the Kenton field office, the Scioto Marsh was formed by a melting glacier that left an indentation on the earth's surface. Over the centuries, this indentation was slowly filled with growing and decaying plants that produced a fertile soil high in organic matter.

"The farmers in the marsh are well aware of how valuable their soil is and what wind erosion can do to it," said Pettit. "They're beginning to replace the old windbreaks, and several are trying new ways to protect their soil and crops. In the end, it will probably take a combination of practices to bring the wind erosion under control."

**Paul D. Barker,**  
associate editor, *Soil and Water Conservation News*,  
SCS, Washington, DC



Keeping the soil moist should reduce wind erosion on the muck soil of the Scioto Marsh.



Ron Wyss can set his new pivot irrigation system to operate at low pressure.



# SCS on Target for Ohio Farms

**M**any corn and soybean farmers in central Ohio are using conservation practices to save not only soil but also time and money.

"No-till really saves me time. That's what I like about it," said Frank Haudenshield, who farms about 566 acres in Hardin County in addition to working 10 hours a day at a job in nearby Kenton. "And I'm getting better at no-till. This year I bought a boom marker, and that makes spraying a lot easier."

Haudenshield said the soil loss on his cropland, most of which is on 2- to 6- percent slopes, has dropped from about 10 tons per acre per year to about 2 tons per acre per year since he started using no-till in 1984. He is also installing four grassed waterways and two rock chute structures to carry water runoff from his fields into a stream.

According to district conservationists with the Soil Conservation Service, farmers such as Haudenshield are much like other professional managers. They know they have limited resources, and to succeed they must manage their resources as best they can. Many of these farmers are finding that practices designed to save soil and water can also save time and money.

The time savings possible with no-till was a big attraction for Will Waidelich, who is in his second year of no-tilling a corn-wheat-soybean rotation in Pickaway County. "I work full time as a teacher," Waidelich said. "I simply don't have time for conventional tillage. For me, it's a choice between making six trips across the field or two trips."

Waidelich, who contracts for spraying, said it costs him \$60 an acre to grow corn with no-till and he expects an average yield of 100 bushels per acre. He said he can break even with 10 bushels of soybeans per acre, and he expects 30.

Fairfield County farmer Fred Zollinger found that a switch to no-till fit conveniently into his plans 8 years ago. "We had to buy a new corn planter anyway, so we bought a no-till drill," he said. He has also installed an 800-foot diversion that further reduces erosion on his cropland and protects his house from flood damage during heavy rainstorms.

Zollinger and his son have turned their 300-acre farm into a showcase for conservation in the Buckeye Lake watershed in the

steeper eastern part of Fairfield County. While some of his neighbors who plow up-and-down slope are losing up to 25 tons of soil per acre each year, Zollinger's neatly contoured and alternated strips of no-till corn and wheat help hold his soil loss to less than 1 ton per acre per year.

The counties where these farmers farm—Hardin, Pickaway, and Fairfield—lie in the rolling, glaciated land between the Appalachian Mountains to the east and the flatter Corn Belt to the west. This area receives 35 to 39 inches of rainfall a year and has a growing season longer than 4 months. Most of the soils are considered prime farmland. The area's expanding cities and towns have provided opportunities for off-farm employment and easier access to markets but are also converting valuable farmland to nonfarm uses.

The soil resource here is also threatened by erosion. SCS estimates that about 32 percent of the cropland in Ohio is eroding at a rate greater than "T" (the maximum acceptable rate of erosion, which is 3 to 5 tons per acre per year for most of the soils in Ohio). This excessive soil loss threatens long-term farm productivity. Another effect is the more than \$108 million Ohioans pay every year to clean sediment out of lakes, rivers, reservoirs, culverts, and roadside ditches and to remove silt and soil nutrients

from a variety of other places where they have become pollutants.

As a result, 25 of Ohio's 88 counties—including Hardin, Pickaway, and Fairfield—were targeted 2 years ago by the Soil Conservation Service for intensive erosion-control work. SCS assigned additional soil conservationists to the field offices in these counties to contact farmers and help them plan and apply conservation practices that are suited to their farming operations.

"We're running into fewer and fewer people who are denying that they have an erosion problem," said Donald J. Pettit, SCS district conservationist at the Kenton field office in Hardin County. "The only question is what they're willing to do about it."

Pettit said the practicality and cost-effectiveness of no-till has helped to make it the most popular conservation practice in Hardin County. He said no-till is now practiced on about 15 percent of the 242,000 acres of cropland in the county.

"What we wanted to see happen, has happened," Pettit said. "The conservation planning we've done over the past 2 years is now being implemented. Farmers who at first rented no-till planters from the conservation district are beginning to buy their own. Many are going on to install grassed waterways in the draws where gully erosion is a problem. We recommend they combine



Surface runoff from a grassed waterway empties from the right into this rock chute structure on Frank Haudenshield's farm.



management practices such as no-till, contour stripcropping, and crop rotations with the more expensive structural practices."

Jerry Leist is a Pickaway County farmer who, 2 years ago, was losing about 12 tons of soil per acre per year on his 270-acre cornfield. His topsoil was less than 8 inches deep. He then switched from straight corn cropping to a corn-soybean-wheat rotation, and his soil loss dropped to about 5 tons per acre per year. Last year he began using no-till, and his soil loss dropped to under 2 tons per acre per year.

"I'm comfortable with no-till corn now," Leist said. "But my first year, I was a nervous wreck. My neighbors would ask, 'What happened in that field that turned brown?' I couldn't bear to look at it. But I'm comfortable with it now and hope to get about 110 bushels to the acre this year."

Leist is now installing grassed waterways where gullies were beginning to form. "These will save me more soil, and also time and money in the long run," he said. "I will be able to drive my farm machinery across the grassed waterways. Before, I had to stop at the ditch and turn around, which adds up to a lot more time and fuel costs."

The waterways—one is 2,600 feet long and the other is 1,000 feet long—will carry off excess surface water. Plastic drainage pipe below the surface alongside the waterways will carry off subsurface water. All of the surface water from the waterways will be collected at a water retention basin and lowered through a pipe-drop structure to a deeper outlet channel.

According to Mark Scarpitti, SCS district conservationist at the Circleville field office in Pickaway County, this system, which is costing Leist about \$4,500, will be able to drain within 24 hours the water that falls during the most intense storm usually experienced during a 10-year period. A grassed emergency spillway to the side of the basin is designed to handle water from more intense storms.

"These structures are particularly well suited to the soils and topography of this area," Scarpitti said. "The basin will temporarily hold the water and release it in a controlled manner. This will prevent another gully from forming where the water enters the outlet channel."

Will Waidelich is installing two water-and-sediment control basins on his 42-acre farm, at a cost of \$2,500. The two basins can easily be seen from State Route 56, a busy two-lane highway that passes within several hundred feet.

"Will has a relatively small farm," Scarpitti said, "but since he's been installing these basins some of the county's bigger operators have been keeping an eye on his operation. One farmer who had previously shown little interest in conservation has been up to look at them. This is the way these ideas spread."

Such on-the-ground conservation practices often help to convince other farmers in the area to include conservation planning in their operations. "Once the farmers see results," said Don LeBold, SCS soil conservationist at the Lancaster field office in Fairfield County, "they're willing to go along with it. I don't care how many words you use, if you can show the farmers results they'll go along with it. That diversion on Fred Zollinger's farm, for instance, has sold more conservation in that part of Fairfield County than anything else has."

The technical assistance provided by SCS in these counties is administered through the local soil and water conservation districts. Once a farmer decides to work with the local district, an SCS conservationist helps the farmer draw up a conservation plan to achieve the farmer's goals.

"The conservation plan is what it's all about," LeBold said. "It gives the farmers something definite to think about. And, believe me, most of them do think about it. Then, when they're ready to act, the plan is already in place and they know what they're going to do."

The districts, which are governed by local residents, provide information, encouragement, and even some equipment. They conduct information campaigns through newspaper columns, radio announcements, newsletters, fact sheets, posters, form letters, field days, workshops, and other activities.

"I think the real success of the program here is based on the district supervisors," said Gary Smith, SCS district conservationist at the Lancaster field office. "The supervisors are willing to go out on a limb and try new things. They will back the technical staff."

Smith said the Fairfield Soil and Water Conservation District has leased a total of four no-till corn planters that it rents to farmers. "We've also dropped our low-priority projects, such as designing ponds," he said. "We've got enough work to do just working on erosion."

**Paul D. Barker,**  
associate editor, *Soil and Water Conservation News*,  
SCS, Washington, DC



Frank Haudenschild has reduced the annual soil loss on his cropland from 10 tons to 2 tons per acre by the use of no-till and grassed waterways.



## Forage Grass May Help Reclaim Salty Soil

A forage grass may help farmers and ranchers reclaim salt-affected soils.

Field trials are underway to determine the ability of Sordan grass to enhance the leaching of sodium from soils that have high concentrations of sodium salts. Sordan grass is a commercially available sorghum-sudangrass hybrid that can grow on salty soils and produce silage for livestock.

Salt buildup, which is a severe limitation for most plants, is common in arid regions where rainfall is insufficient to leach salts out of the soil as they weather from minerals. Washing the bulk salt out of the soil without replacing the sodium, however, can destroy the soil structure. The soil collapses, seals up, and loses its permeability to air and water.

Researchers with USDA's Agricultural Research Service (ARS) discovered in April that the roots of Sordan grass release an unusually high amount of carbon dioxide. In moist soil, carbon dioxide forms carbonic acid, which in turn dissolves calcium carbonate (lime). Once the calcium is dissolved in solution, it replaces the unwanted sodium attached to clay particles in the soil. The released sodium can then be leached out of the soil by irrigation without destroying the soil structure.

While helping to remove excess sodium from the soil, Sordan grass can also produce a usable silage crop. In one test, Sordan grass was planted in a salt-affected field where the rancher had been unable to raise silage corn the previous year because of the soil's low moisture permeability. The same field produced about 20 tons of Sordan grass per acre, which the rancher cropped and put in his corn silage pit.

Additional information can be obtained from Charles W. Robbins, an ARS soil scientist at the Snake River Conservation Research Center, Route 1, Box 186, Kimberly, Idaho 83341. The Soil Conservation Service is assisting with field trials in Wyoming, South Dakota, Oregon, Kansas, Oklahoma, and Texas.

## No-Tillage on Clay Soil

No-tillage was compared to conventional tillage on clay soils in the Temple, Tex., area by scientists with the Texas Agricultural Experiment Station and USDA's Agricultural Research Service.

Experiments were conducted for 3 years, 1982–1984, to determine the effects of conventional tillage and no-tillage on soil properties, soil water content, and rooting of wheat, cotton, and sorghum grown on a swelling clay.

The conventional tillage treatment used repeated disk and chisel operations to control weeds and incorporate all crop residues. The no-tillage treatment had no primary tillage or mechanical cultivation and was maintained weed-free with different herbicide combinations.

Both conventional and no-tillage received identical quantities of nitrogen and phosphorus to maximize crop yield. Soil water content did not differ in conventional and no-tillage treatments.

Both soil strength and bulk density were equal for conventional and no-tillage treatments in the nonwheel traffic areas, but were greater in the top 15 centimeters (5.9 inches) of the no-tillage wheel traffic areas, as compared to similar areas in the conventional tillage treatment.

Root density was unaffected by tillage or wheel traffic beyond the 15-centimeter soil depth, but varied with respect to tillage treatment and year, in the surface soil layer.

No-tillage cropping systems did not adversely affect crop yield but cut production costs by 5 percent.

Reprinted from *Brief Reports on Agricultural Research in Texas*, January, February, March 1985 issue, Texas Agricultural Experiment Station, The Texas A&M University, College Station, Tex.

## Long-Term No-Tillage Impact

Can a soil be farmed with the no-tillage system for 20 years and still maintain crop yields similar to those obtained by conventional tillage methods?

Agronomists have investigated this question by applying either no-tillage or plowed treatments for more than 20 years to three Ohio soil types. Comparisons of yields of corn, soybeans, and oats as affected by tillage were made by calculating 5-year averages beginning with the period 1963–1967 and repeating the calculation through the 1979–1983 period.

Corn yields were significantly higher under no-tillage compared to the plowed treatment on a Wooster silt loam. The average yearly yield increase associated with no-tillage was 17 bushels per acre. On a Crosby silt loam, response to no-tillage continuous corn was mixed, with several 5-year periods showing a yield increase and several showing a yield decrease. On a heavier silty clay loam Hoytville soil, however, continuous corn yields were always lower under no-tillage than when a plowed treatment was used. Rotating corn with soybeans or hay generally eliminated the corn yield reduction associated with no-tillage.

Soybean and oat yields followed trends similar to corn. The long-term study indicated, however, that soybean disease pressures may be greater on the Hoytville soil where no-tillage crop production practices have been continuously maintained. The selection of proper soybean varieties is, therefore, important when no-tillage is maintained on a heavier soil.

Reprinted from the May–June 1985 issue of *Ohio Report*, Ohio Agricultural Research and Development Center, The Ohio State University.

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## New Publications

### Have You Considered . . . Conservation Tillage?

by the Conservation Tillage  
Information Center

This pamphlet illustrates how poor farming practices can result in devastating consequences. Using full-color photographs, it also describes the advantages to using conservation tillage. It lists the Federal, State, and local agencies that assist farmers in planning for conservation tillage.

For a copy of this 8-page pamphlet contact the Conservation Tillage Information Center, 2010 Inwood Drive, Executive Park, Fort Wayne, Ind. 46815.

### Erosion and Soil Productivity

by the American Society of  
Agricultural Engineers

This publication includes papers presented at the National Symposium on Erosion and Soil Productivity in December 1984, in New Orleans, La. Researchers and conservationists gathered with the purpose of assembling and disseminating current research results and information on the effect of erosion on crop yields, soil properties, management, and economics.

Papers are categorized under the headings: erosion effects—experimental evaluations, chemical and physical effects of erosion and relation to productivity, quantitative assessments of the effects of erosion on soil productivity, and economics and resource allocation.

Copies of the 289-page book are available for \$26 (\$22 for members of the American Society of Agricultural Engineers) from ASAE, Dept. 055, 2950 Niles Road, St. Joseph, Mich. 49085-9659.

### Design and Operation of Farm Irrigation Systems

Edited by M. E. Jensen

The many authors of this book have tried to bring together in one volume the state-of-the-art of the many facets involved in designing and operating farm irrigation systems. They hope to provide guidance to practicing engineers and engineering students in using the material for designing irrigation systems.

The 18 chapters here include such subjects as the role of irrigation in food and fiber production, farm resources and system selection, salinity in irrigated agriculture, farm water delivery systems, and design and operation of trickle/drip systems.

Included in this 829-page volume are sample calculations used throughout the text, and lists of symbols and conversion factors.

A copy of this volume is available for \$44.95 from American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, Mich. 49085-9659.

### Water Resources Planning

by Neil S. Grigg

In this publication the author explains what we can do to solve the water crisis and thus provide better water-related services at a reasonable cost without causing environmental damage. He considers both the bureaucratic and technical aspects of water planning.

The first part of this book describes principles and techniques of planning: the importance of planning to the management process, how planning should work, different approaches to organizing for water planning in government, how to use economics and evaluations to prepare useful decision information, financial analyses, computers and modeling, and the place of environmental planning in water resources

management. The second part of the book consists of case studies that demonstrate these principles in action.

The book covers a wide variety of water problems: water supply, wastewater management, flood control, and urban storm-water management, among others. The problems are viewed from the perspectives of local, State, and Federal Government, as well as the private sector.

The book is intended for students and practitioners in engineering, natural resources management, public administration, and various policy sciences.

It is available for \$39.95 from McGraw-Hill Book Company, 1221 Avenue of the Americas, New York, N.Y. 10020.

### Cost Data for Landscape Construction, 1985

by Kerr Associates, Inc.

The sixth edition of this publication is designed to provide all the information needed to estimate the construction costs of projects designed or specified by landscape architects and others concerned with site and landscape development.

New in this edition are illustrations of composite work items which allow readers to picture the work item, thereby helping them select just the right costs for a particular project.

The information presented here is in the form of average unit prices for a variety of landscape construction items used for preparing estimates. Most items contain eight columns of information: key, description, unit, crew and equipment, per day output, installation cost, materials cost, and total cost. The key column has a three-digit number which identifies the item for easy access when using the computer software and database programs also developed by Kerr Associates.

This publication should be useful to anyone responsible for estimating landscape projects.

*Cost Data for Landscape Construction* is available for \$33.50 from Kerr Associates, Inc., Suite 100, 1942 Irving Avenue South, Minneapolis, Minn. 55403.

### The Federal Lands Revisited

by Marion Clawson

With 45 years of being professionally concerned with the Federal lands of the United States, the author summarizes the continuing debate over our public lands between those who believe in permanent public management and those who do not.

Written in serious but nontechnical language, this book is primarily concerned with the Federal lands administered by the Forest Service and the Bureau of Land Management.

The author first presents a brief historic overview of Federal lands, their uses, general management, and planning; he gives his five conceptual alternatives for management of these lands; and concludes with brief chapters on special problems of intermingled ownerships, public participation, and ideas on needed research.

A copy of this 324-page book is available for \$8.95 from Resources for the Future, Customer Services, P.O. Box 4852, Hampden Station, Baltimore, Md. 21211.

### Recent Soil Surveys Published

by the Soil Conservation Service

**Kansas:** Lincoln County.  
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